CLAIMS:

1. A method comprising:

defining a linear programming formulation of a support vector machine classifier;

solving an exterior penalty function of a dual of the linear programming formulation to produce a solution to the support vector machine classifier; and

selecting an input set for the support vector machine classifier based on the solution.

2. The method of claim 1, further comprising minimizing the exterior penalty function for a finite value of a penalty parameter.

3. The method of claim 1, wherein the linear programming formulation is a 1-norm linear programming formulation.

4. The method of claim 1, wherein the solution is a least 2-norm solution.

5. The method of claim 1, wherein the support vector machine classifier is a linear support vector machine classifier, and selecting an input set includes selecting a set of input features of the linear support vector machine classifier.

6. The method of claim 1, wherein the support vector machine classifier is a nonlinear support vector machine classifier, and selecting an input set includes selecting a set of kernel functions for the nonlinear support vector machine classifier.

7. The method of claim 1, further comprising:

calculating a separating surface based on the selected input set and the support vector machine classifier; and

classifying data using the separating surface.

8. The method of claim 7, further comprising classifying the data into two sets of data using the separating surface.

9. The method of claim 7, wherein the separating surface is one of an n-dimensional hyperplane or a nonlinear surface.

10. The method of claim 1, further comprising applying a Newton-based algorithm to solve the exterior penalty function.

11. The method of claim 1, further comprising applying one or more linear constraints to the solution of the exterior penalty function.

12. The method of claim 1, wherein selecting an input set includes selecting a subset of input features from a larger set of input features that is substantially larger than the subset of input features.

13. The method of claim 12, wherein the subset of input features includes less than approximately one percent of the larger set of input features.

14. The method of claim 12, wherein the subset of input features includes less than approximately .1 percent of the larger set of input features.

15. The method of claim 12, wherein the larger set of input features includes more than 20,000 input features, and the subset of input features includes less than ten input features.

16. A classification system comprising:

a processor that applies a linear programming formulation of a support vector machine classifier to classify data based on an input set; and

an input module that generates the input set based on a solution of an exterior penalty function of a dual of the linear programming formulation.

17. The system of claim 16, wherein the input module generates the input set based on a minimization of the exterior penalty function for a finite value of a penalty parameter.

18. The system of claim 16, wherein the linear programming formulation is a 1-norm linear programming formulation.

19. The system of claim 16, wherein the solution is a least 2-norm solution.

20. The system of claim 16, wherein the support vector machine classifier is a linear support vector machine classifier, and the input set includes a set of input features of the linear support vector machine classifier.

21. The system of claim 16, wherein the support vector machine classifier is a nonlinear support vector machine classifier, and the input set includes a set of kernel functions for the nonlinear support vector machine classifier.

22. The system of claim 16, wherein the processor calculates a separating surface based on the selected input set and the support vector machine classifier, and classifies data using the separating surface.

23. The system of claim 22, wherein the processor classifies the data into two sets of data using the separating surface.

24. The system of claim 22, wherein the separating surface is one of an n-dimensional hyperplane or a nonlinear surface.

25. The system of claim 16, wherein the input module applies a Newton-based algorithm to solve the exterior penalty function.

26. The system of claim 16, wherein the solution to the exterior penalty function is subject to one or more linear constraints.

27. The system of claim 16, wherein the input set is a subset of input features selected from a larger set of input features that is substantially larger than the subset of input features.

28. The system of claim 27, wherein the subset of input features includes less than approximately one percent of the larger set of input features.

29. The system of claim 27, wherein the subset of input features includes less than approximately .1 percent of the larger set of input features.

30. The system of claim 27, wherein the larger set of input features includes more than 20,000 input features, and the subset of input features includes less than ten input features.

31. A computer-readable medium comprising instructions to cause a processor to:

define a linear programming formulation of a support vector machine classifier;

solve an exterior penalty function of a dual of the linear programming formulation to produce a solution to the support vector machine classifier; and

select an input set for the support vector machine classifier based on the solution.

32. The computer-readable medium of claim 31, further comprising instructions to cause a processor to minimize the exterior penalty function for a finite value of a penalty parameter.

33. The computer-readable medium of claim 31, wherein the linear programming formulation is a 1-norm linear programming formulation.

34. The computer-readable medium of claim 31, wherein the solution is a least 2-norm solution.

35. The computer-readable medium of claim 31, wherein the support vector machine classifier is a nonlinear support vector machine classifier, and the input set includes a set of input features for the linear support vector machine classifier.

36. The computer-readable medium of claim 31, wherein the support vector machine classifier is a nonlinear support vector machine classifier, and the input set includes a set of kernel functions for the nonlinear support vector machine classifier.

37. The computer-readable medium of claim 31, further comprising instructions to cause a processor to:

calculate a separating surface based on the selected input set and the support vector machine classifier; and

classify data using the separating surface.

38. The computer-readable medium of claim 37, further comprising instructions to cause a processor to classify the data into two sets of data using the separating surface.

39. The computer-readable medium of claim 37, wherein the separating surface is one of an n-dimensional hyperplane and a nonlinear surface.

40. The computer-readable medium of claim 31, further comprising instructions to cause a processor to apply a Newton-based algorithm to solve the exterior penalty function.

41. The computer-readable medium of claim 31, further comprising instructions to cause a processor to apply one or more linear constraints to the solution of the exterior penalty function.

42. The computer-readable medium of claim 31, further comprising instructions to cause a processor to select a subset of input features from a larger set of input features that is substantially larger than the subset of input features.

43. The computer-readable medium of claim 42, wherein the subset of input features includes less than approximately one percent of the larger set of input features.

44. The computer-readable medium of claim 42, wherein the subset of input features includes less than approximately .1 percent of the larger set of input features.

45. The computer-readable medium of claim 42, wherein the larger set of input features includes more than 20,000 input features, and the subset of input features includes less than ten input features.